Evotherm 3G, Advera WMA and Foamed Asphalt Comparison ND 2011-02

Research Advisory Committee
November 9 & 10, 2010

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NDDOT - Materials & Research Division

Topics

- Objective
- Scope
- Evaluation
- Construction
  - SS-4-041(012)057
  - SCB-6-032(045)219
  - SS-4-003(011)159

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Objective

- The objective of this project is to compare the performance of WMA produced using Evotherm 3G, Advera® WMA, and the foamed asphalt process.

Scope

- This research project will use thin lift paving projects to evaluate the WMA production processes and performance.
  - SS-3-015(010)060-Evotherm 3G WMA , Foamed Asphalt, & HMA
  - SS-3-015(018)073-Evotherm 3G WMA , Foamed Asphalt, & HMA
  - SS-4-003(011)159-Advera® WMA & HMA
  - SS-4-041(012)057-Advera® WMA & HMA
  - SCB-6-032(045)219-Evotherm 3G WMA with recycled asphalt & HMA with recycled asphalt

Evaluation

Pavement Distress

- Rutting measurements
- Thermal cracks
- Cracking distresses caused by loading and traffic

Construction

- Density
- Temperature
- Fuel Consumption

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SS-3-041(012)057

- 2” Thin Lift Overlay
- Advera® WMA
- Approximately 5 miles of WMA
- Approximately 5 miles of HMA for Control
- Blade Leveling

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SS-3-041(012)057 Photos

Advera in tote.
Physical appearance
of powdered sugar.

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SS-3-041(012)057 Photos

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SS-3-041(012)057
Compaction Control

ND 41 - WMA Compaction Control

Date	Core Density	Maximum Theoretical Density	Compaction
Average	142.6	153.0	93.2%

ND 41 - HMA Compaction Control

Date	Core Density	Maximum Theoretical Density	Compaction
Average	141.2	153.7	91.9%

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Fuel Consumption

ND 41 - WMA Fuel Consumption

Type	Gallons of Burner Fuel	Total Tons of Mix	Gal/Ton
Total/Average	13,564	9,674	1.39

ND 41 - HMA Fuel Consumption

Type	Gallons of Burner Fuel	Total Tons of Mix	Gal/Ton
Total/Average	17,315	11,995	1.44

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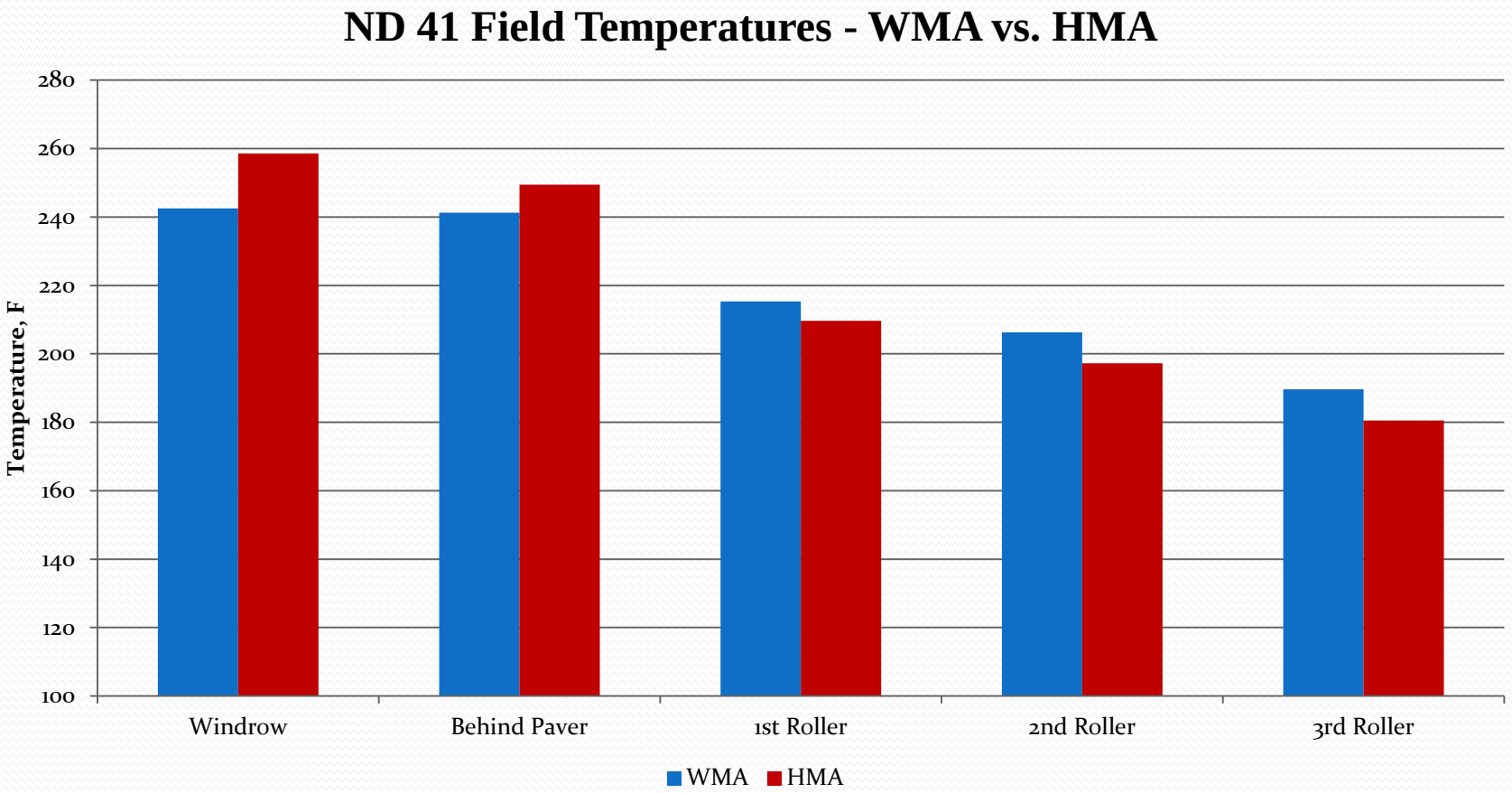
Field Temperatures



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SS-6-032(045)219

- 2” mill and fill
- Evotherm 3G
- Use of recycled asphalt
- Approximately 5 miles of WMA
- Approximately 5 miles of HMA used for control
- Evotherm mixed by supplier

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Compaction Control

ND 32 - WMA Compaction Control

Date	Core Density	Maximum Theortical Density	Compaction
Average	138.8	150.1	92.5%

ND 32 - HMA Compaction Control

Date	Core Density	Maximum Theortical Density	Compaction
Average	139.6	150.7	92.6%

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SS-6-032(045)219 Fuel Consumption

ND 32 - WMA Fuel Consumption

Type	Gallons of Burner Fuel	Total Tons of Mix	Gal/Ton
Total/Average	11,652	7,429	1.62

ND 32 - HMA Fuel Consumption

Type	Gallons of Burner Fuel	Total Tons of Mix	Gal/Ton
Total/Average	15,232	8,958	1.72

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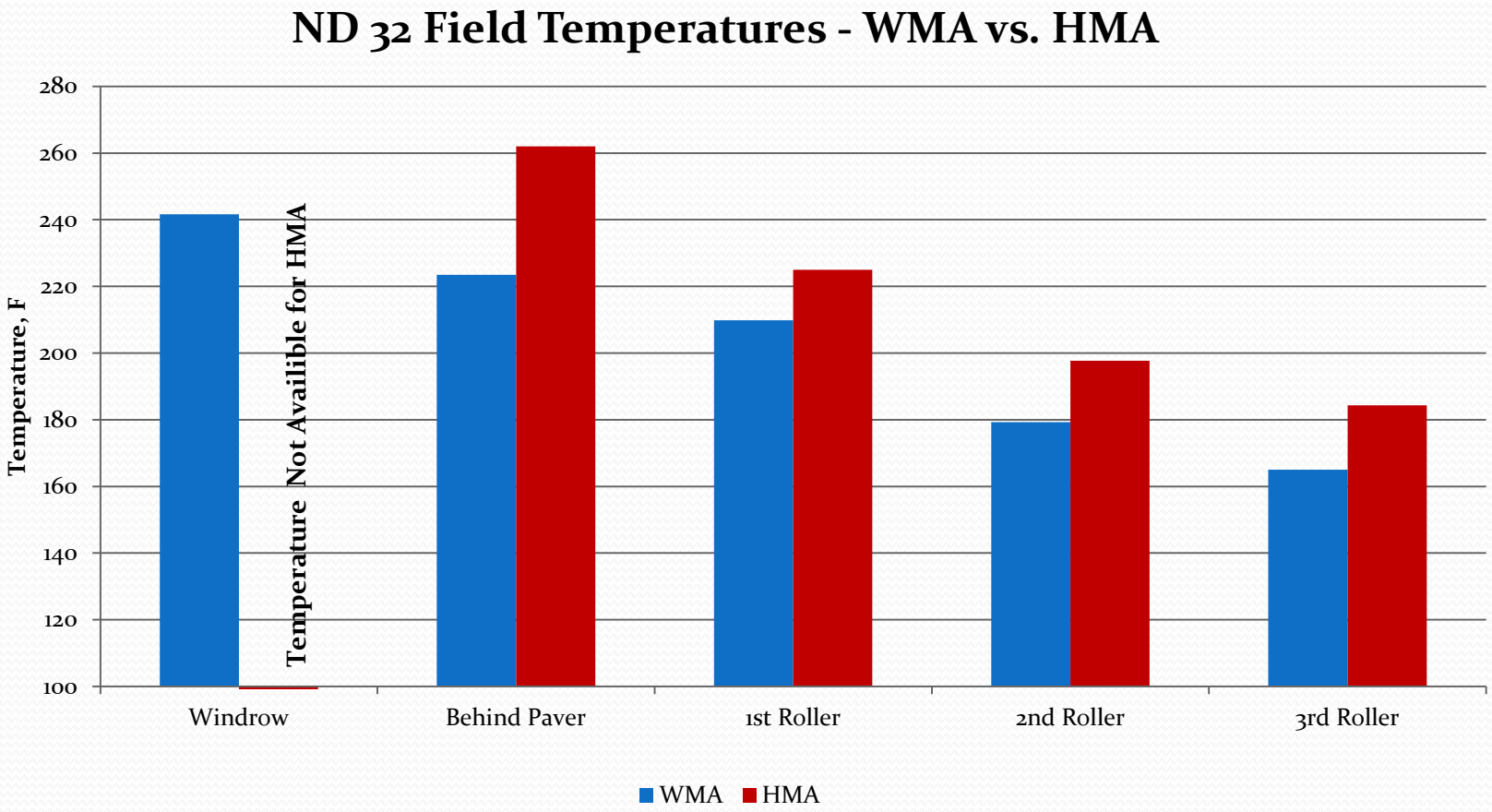
Field Temperatures



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SS-4-003(011)159

- 2” Thin Lift Overlay
- Advera® WMA
- Approximately 5 miles of WMA
- Approximately 5 miles of HMA used for control
- Blade Leveling

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SS-4-003(011)159
Compaction Control

ND 3 - WMA Compaction Control

Date	Core Density	Maximum Theortical Density	Compaction
Average	142.7	153.7	92.8%

ND 3 - HMA Compaction Control

Date	Core Density	Maximum Theortical Density	Compaction
Average	141.7	153.8	92.1%

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SS-4-003(011)159
Fuel Consumption

ND 3 - WMA Compaction Control

Date	Core Density	Maximum Theoretical Density	Compaction
Average	142.7	153.7	92.8%

ND 3 - HMA Compaction Control

Date	Core Density	Maximum Theoretical Density	Compaction
Average	141.7	153.8	92.1%

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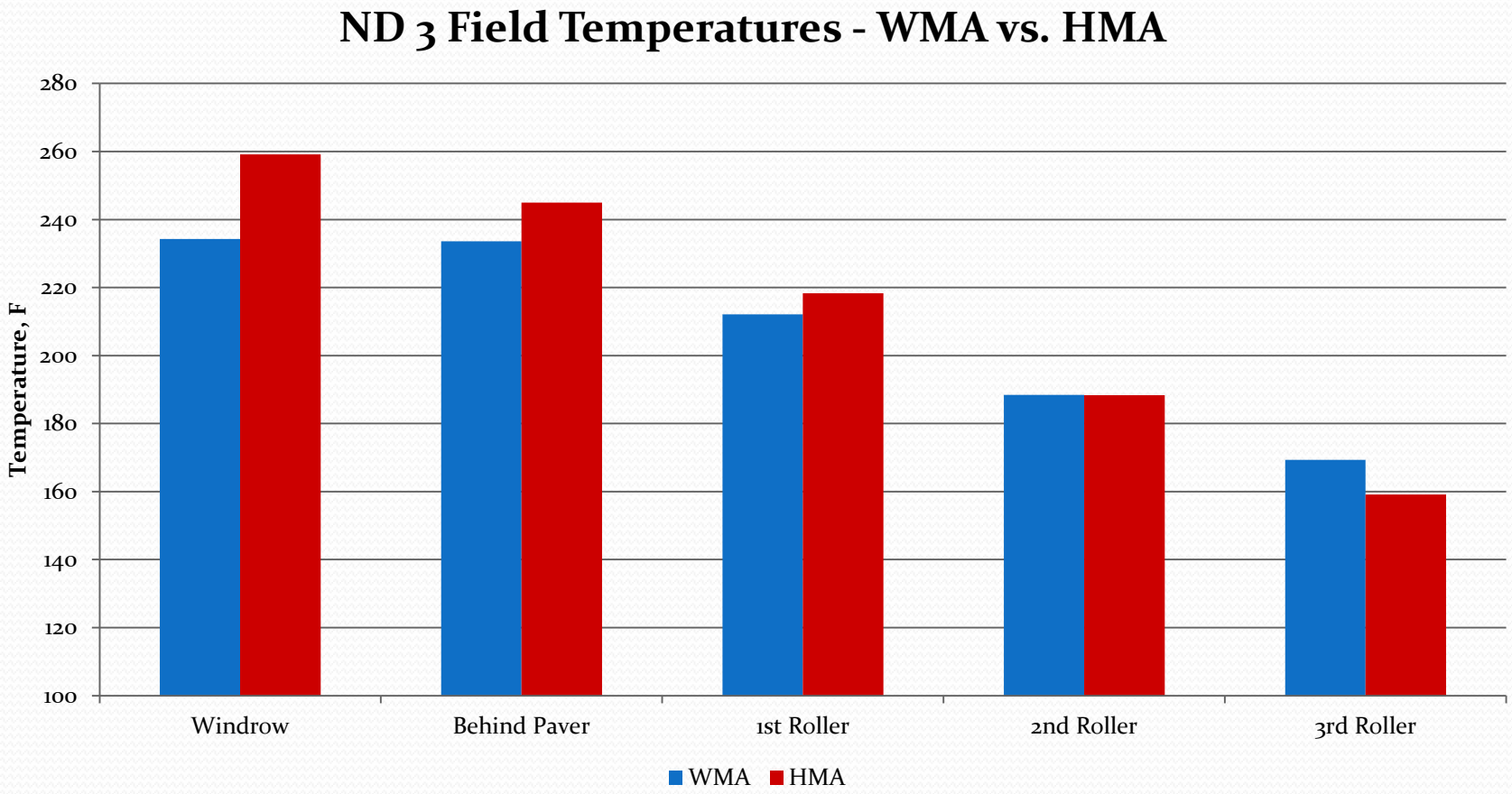
Missing Data

- SS-4-003(011)159 – Waiting for information from project engineer.

- SS-3-015(010)060 & SS-3-015(018)073 – Project was pushed until 2012

SS-4-003(011)159
Field Temperatures



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Summary

- Compaction is not an issue.
- Fuel Consumption – 3.5% to 5.8% decrease in burner fuel with WMA
- Field Temperature
  - Advera – WMA 10 degrees less HMA behind paver
  - Evotherm – WMA 25 degrees less HMA behind paver
- ND 15 project has been pushed until 2012 construction season.

Questions?

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